# THE EARLY IMMATURE STAGES OF *HYPOCHRYSOPS ELGNERI BARNARDI* WATERHOUSE AND *H. HIPPURIS NEBULOSIS* SANDS (LEPIDOPTERA: LYCAENIDAE)

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## Abstract

Eggs and early instar larvae of *Hypochrysops elgneri barnardi* Waterhouse and *H. hippuris nebulosis* Sands from northern Queensland are described and illustrated. Eggs of each were laid singly on the food plants, those of *H. e. barnardi* mostly beneath leaves of the tree *Nauclea orientalis* (Rubiaceae) and those of *H. h. nebulosis* mostly on the rhizome of the fern *Pyrrosia lanceolata* (Polypodiaceae). Small larvae of *H. e. barnardi* ate leaves of *N. orientalis* whereas small larvae of *H. h. nebulosis* mainly ate the rhizome until the third instar, when they fed on the fern blades. Larvae of *H. e. barnardi* and *H. h. nebulosis* passed through 7 and 6 instars, respectively.

## Introduction

*Hypochrysops elgneri barnardi* Waterhouse and *H. hippuris nebulosis* Sands are known in mainland Australia only from areas in or near rainforest within Cape York Peninsula, northern Queensland. The life histories of each have been recorded recently (Samson *et al.* 1997, Johnson and Valentine 2001). However, the eggs and first instars have not been described, other than a hatched egg of *H. e. barnardi* (Samson *et al.* 1997). Here I describe the early immature stages of both species from material collected near the Claudie River in August 2001.

### *Hypochrysops elgneri barnardi*

*Egg* (Fig. 1). A flattened sphere, with coarse network of fine oblique ridges forming diamond-shaped cells with long spines at their intersection; dark greenish blue, spines white. Diameter 0.9 mm including spines.

*First instar* (Fig. 2). Prothorax (T1) with dark brown marginal hairs; meso- and metathorax (T2 and T3) and abdominal segments 1-7 (A1-A7) each with three pairs of long lateral hairs, the central pair brown on A3-A7 but otherwise colourless; anal segments A8-A10 with very long dark brown or colourless marginal hairs; each segment with one pair of colourless ventrolateral hairs; prothoracic plate dorsally with two pairs of long dark brown hairs; T2 with two pairs of long dark brown dorsal hairs, the two hairs on each side held together; T3-A6 each with two pairs of dorsal hairs, the outer pair short, dark brown on A1-A3 and A6 but otherwise colourless, the inner pair long dark brown though of decreasing length from T3 to A3 and held together vertically, much shorter than outer pair on A4-A6; two pairs of long brown dorsal hairs on A7; three pairs of long dark brown and one pair of shorter dark brown dorsolateral hairs on A8-A10; yellowish green, reddish brown dorsally on T1 and A1-A3 and A7-A10; head, prothoracic and anal plates black.

### *Hypochrysops hippuris nebulosis*

*Egg* (Fig. 3). A flattened sphere, with closely spaced oblique ridges forming small deep diamond-shaped cells, with short spines, micropylar area sunken; pale green. Diameter 1.0 mm including spines.

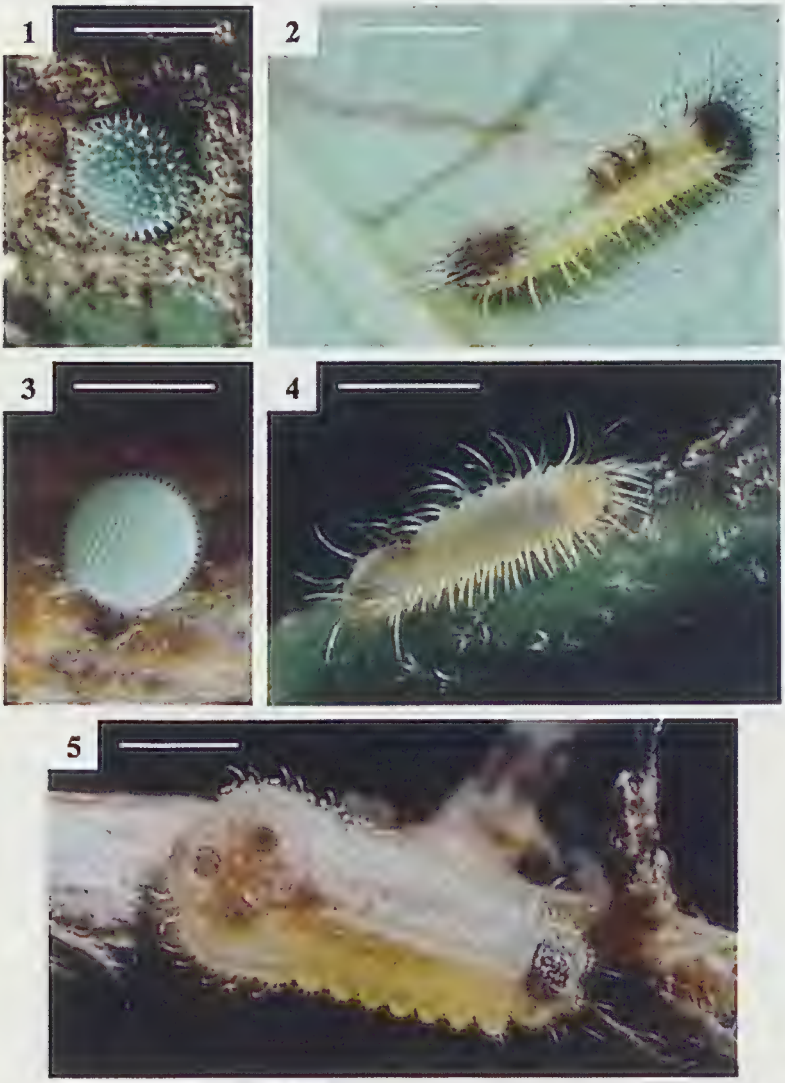
*First instar* (Fig. 4). T1 with colourless marginal hairs; T2-A7 each with three pairs of long colourless lateral hairs; A8-A10 with long colourless marginal hairs; each segment with one pair of colourless ventrolateral hairs; prothoracic plate dorsally with two pairs of long greyish hairs; T2-T3 each with two pairs of long colourless dorsal hairs; A1-A6 each with two pairs of dorsal hairs, the outer pair short, greyish on A6 but otherwise colourless, the inner pair long and colourless on A1-A3, short and colourless on A4-A5 and long dark grey and held together medially on A6; numerous pairs of short colourless dorsal and dorsolateral hairs on A7-A10; pale greenish yellow, a reddish dorsal spot on A6; head pale brown, prothoracic plate body colour, anal plate greyish.

*Second instar* (Fig. 5). Flattened with scalloped margins, dorsal ridge on T2-A5, A7-A10 broad; colourless anterior and posterior hairs; T2 with one pair of lateral hairs and T2-A3 each with one pair of ventrolateral hairs, all colourless; one pair of colourless dorsal hairs from rear of prothoracic plate; T2-A4 each with one pair of dorsal hairs, brown on A4 but otherwise colourless; dense secondary setae; cream, T1 reddish anteriorly, a reddish dorsal patch on A6-A8; head pale brown, prothoracic plate glossy black, anal plate glossy grey. Newcomer's organ present on A7 and tentacular organs (TOs) present on A8, the area surrounding the TOs large and raised, brown to black.

*Third instar*. Form similar to second instar, but with additional dorsal hairs including one brown pair on A5; greyish white with reddish brown at front of T1, dorsally on A6-A8 and in subdorsal band on T2-A6, a white lateral line, spiracles black.

**Life history notes**

I found eggs of *H. e. barnardi* singly beneath leaves of *Nauclea orientalis* (Rubiaceae), in feeding scars, necrotic areas or on healthy green tissue. Only a few eggs were found on branches; they may have been more numerous but were much harder to see than on the leaves. The incubation time is uncertain as the date of oviposition was unknown, but must be at least 6 days as that was the time that elapsed until hatching of some field-collected eggs. First instar larvae of *H. e. barnardi* were also found beneath leaves, usually with one or two ants, *Philidris cordatus stewartii* (Forel), on the leaf. Small larvae skeletonised the underside of leaves, but in later instars they ate holes through the leaves as described by Samson *et al.* (1997). Six larvae of *H. e. barnardi* were reared at Mackay under ambient conditions. All passed through seven instars. Mean durations of successive instars were 7 d, 6 d, 6 d, 7 d, 7 d, 10 d and 16 d (n = 5 or 6); the mean larval development time was 60 d (n = 4).




**Figs 1-5.** *Hypochrysops elgneri barnardi*: (1) egg; (2) first instar larva, head at right. *H. hippuris nebulosis*: (3) egg; (4-5) first and second instar larvae, head at right. Scale bars = 1 mm; Figs 1-4 to same scale.

Re-examination of the preserved specimen of *H. e. barnardi* photographed and described by Samson *et al.* (1997) as an 'early instar' showed it to be a second instar, by the presence of hairs on the prothoracic plate. These hairs are absent in later instars.

I found eggs of *H. h. nebulosis* by watching a female at a small spindly tree bearing *Pyrrosia* sp. fern (Polypodiaceae) along its trunk and two branches. There were also several small ant-plants (*Myrmecodia* sp., Rubiaceae) on the tree, with associated ants (*Philidris cordatus*). The female would land on the fern blades, then crawl down towards their base and on to the branch, probing with her abdomen. After appearing to oviposit she would fly a short distance to land on the same or an adjacent tree, but then return. Four eggs appeared to be laid during about 1 hour of observation from around midday. The tree was then examined and four eggs were found, one on the petiole at the base of a fern blade, two on fern rhizome and one beneath debris near the rhizome. Other eggs, mostly hatched, were subsequently found on ferns on other trees. The majority of eggs were laid on the slender rhizome, often partly hidden between the rhizome and the supporting branch, but a few eggs were found on fern blades. All were laid singly.

The newly laid eggs hatched in 8 days. The first two larval instars mostly rested on and fed on the rhizome, grazing the surface or chewing deep pits in the soft tips. However, one larva fed on fern blades in the first instar. By the third or fourth instars feeding seemed to be only on the blades, with larvae eating windows in one surface as illustrated by Johnson and Valentine (2001). One larva of *H. h. nebulosis* passed through six instars from hatching to pupation; several other larvae died during rearing. The mean duration of successive instars was 9 d (n = 4), 9 d (n = 4), 8 d (n = 2), 7 d (n = 2), 7 d (n = 2) and 11 d (n = 1); the larval period of the individual that pupated occupied 51 d.

The description of 'third instar larvae' provided by Johnson and Valentine (2001) differs from mine, and their illustration of a 'fourth instar larva' matches my observations of fifth instars. The discrepancy is explained by those authors having assumed that there were only five larval instars and working backwards from pupation to estimate stage of development (S. Johnson, pers. comm.).

**Acknowledgement**

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**References**

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